



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/089,026	07/02/2002	Pierre Siohan	F40.12-0005	9446

27367 7590 10/04/2006

WESTMAN CHAMPLIN & KELLY, P.A.
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402-3319

EXAMINER

PHILPOTT, JUSTIN M

ART UNIT	PAPER NUMBER
----------	--------------

2616

DATE MAILED: 10/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/089,026

Applicant(s)

SIOHAN ET AL.

Examiner

Justin M. Philpott

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 8-21 is/are rejected.
- 7) ☒ Claim(s) 5 and 7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20020326.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification ("Appendix E" at pages 37-39) is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

2. The listing of references in the Search Report is not considered to be an information disclosure statement (IDS) complying with 37 CFR 1.98. 37 CFR 1.98(a)(2) requires a legible copy of: (1) each foreign patent; (2) each publication or that portion which caused it to be listed; (3) for each cited pending U.S. application, the application specification including claims, and any drawing of the application, or that portion of the application which caused it to be listed including any claims directed to that portion, unless the cited pending U.S. application is stored in the Image File Wrapper (IFW) system; and (4) all other information, or that portion which caused it to be listed. In addition, each IDS must include a list of all patents, publications, applications, or other information submitted for consideration by the Office (see 37 CFR 1.98(a)(1) and (b)), and MPEP § 609.04(a), subsection I states, "the list ... must be submitted on a separate paper." Therefore, the references cited in the Search Report have not been considered. Applicant is advised that the date of submission of any item of information or any missing

element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the IDS, including all "statement" requirements of 37 CFR 1.97(e). See MPEP § 609.05(a).

3. In particular, the applicant-provided search report for PCT/FR00/02716, upon which the instant applicant claims priority, cites a reference (G. Strang and T. Nguyen, "Wavelets and Filter Banks", 1996, Wellesley-Cambridge Press; specifically pages 301-304, 307, 309, 325-331 and 391-392) that the search report indicates anticipates each of applicant's claims 1-10. However, to date, applicant has not provided a copy of this reference to the Office for consideration by Examiner, nor is this reference cited by applicant in an information disclosure statement. Accordingly, this reference has not been considered by Examiner.

Drawings

4. The drawings are objected to because the majority of the elements shown in Figures 1, 5 and 6, as well as all of the elements shown in Figures 2-4 and 7-10, do not include numerical or other labels for clearly identifying the elements described in the specification. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for

consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claims 1, 9, 11, 12, 14-16 and 20 are objected to because of the following informalities: "BFDM/OM" (claim 1, line 1; claim 12, line 1; claim 15, line 1; claim 16, line 1; and claim 20, line 1) should be changed to "biorthogonal frequency division multiplex/offset modulation (BFDM/OM)"; "OFDM/OM" (claims 9, 11 and 14) should be changed to "orthogonal frequency division multiplex/offset modulation (BFDM/OM)"; and "means; a demodulation step" (claim 1, lines 6-7) should be changed to "means; and a demodulation step". Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 9, 11 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, claims 9, 11 and 14 recite the limitation "said

orthogonal multicarrier signal” in claim 15, 1 and 12, respectively. There is insufficient antecedent basis for this limitation in the claim. Applicant may overcome this rejection by changing “said orthogonal multicarrier signal” to “said biorthogonal multicarrier signal”.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, 8, 12, 13, 15, 16, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WIPO International Publication No. WO 98/09383 by Yeap et al.

Regarding claims 1, 12, 15, 16, 18 and 20, Yeap teaches a method for transmitting a biorthogonal (e.g., see page 10, line 15 regarding “biorthogonal”) multicarrier signal (e.g., see abstract regarding “modulate a plurality of carriers”) providing: a modulation step (e.g., within encoder 11, see FIG. 1), by means of a bank of filters (e.g., see FIG. 2 regarding encoder 11 comprising filter bank 21; see also page 8, lines 2-26), having 2M parallel branches, where M is greater than or equal to 2 (e.g., see FIG. 2 regarding branches $y[N-1]$ through $y[0]$), each fed by source data (e.g., $S[i]$ signal at 20) and each comprising an expander of order M and filtering means (e.g., via multi-carrier modulator 22 and filter bank 21); and a demodulation step (e.g., within decoder 13, see FIG. 1), by means of a bank of filters (e.g., see FIG. 3 regarding decoder 13 comprising filter bank 33; see also page 8, line 27 – page 10, line 19), having 2M parallel branches (e.g., see FIG. 3 regarding branches $y^*[N-1]$ through $y^*[0]$), each comprising a

decimator of order M and filtering means (e.g., via decimator 66 in FIG. 6 and filter bank 33/67), and delivering representative data received from the source data (e.g., $S[i]$ represented at output $S'[i]$, see FIG. 6), the filtering means being derived from a predetermined prototype modulation function (e.g., see FIGS. 2 and 3 regarding carrier signal generator 25 and 35 controlling modulator 22 and demodulator 32, respectively).

Additionally, while Yeap teaches a preferred embodiment comprising a modulation step using analysis filters and the demodulation step using synthesis filters, Yeap specifically recognizes that it is well known in the art to reverse these filter types. That is, Yeap teaches it is well known in the art for input signals to be “combined by means of a synthesis filter” (e.g., see page 3, lines 23-24) and output signals of the decoder, or demodulation step, to comprise “an analysis filter” (e.g., see page 3, line 30). While the particular prior art embodiment of Druyvesteyn that is described in Yeap to include such well known teachings (e.g., at page 3, lines 22-32) involves additional complexities which may lead to delays (e.g., see page 3, lines 31-32), it nonetheless would have been obvious to one of ordinary skill in the art at the time of the invention to reverse the aforementioned filter types in Yeap as taught within the prior art of Yeap (e.g., at page 3, lines 22-32) to overcome the disadvantages of conventional systems that typically use a large number of sub-channels for more costly implementation (e.g., see Yeap at page 3, lines 6-13).

Regarding claims 2, 8 and 13, Yeap teaches the method discussed above regarding claims 1, 15 and 12. Further, while Yeap may not specifically disclose the filters are grouped as a polyphase matrix or as one of transverse structure filters, ladder structure filters, or trellis structure filters, Examiner takes official notice that grouping filters as a polyphase matrix or as

one of transverse structure filters, ladder structure filters, or trellis structure filters is well known in the art of filtering for providing efficient filtering means. Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to group the filters in Yeap as a polyphase matrix or as one of transverse structure filters, ladder structure filters, or trellis structure filters since such grouping of filters is well known in the art of filtering for providing efficient filtering means.

10. Claims 3, 4, 6, 9, 11, 14, 17, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yeap in view of Applicant's Admitted Prior Art (AAPA).

Regarding claims 9, 11 and 14, Yeap teaches the method discussed above regarding claims 15, 1 and 12, respectively, however, may not specifically disclose the signal is an OFDM/OM signal. AAPA teaches that it is well known in the art that OFDM/OM has the advantage of "operat[ing] without any guard interval and also provid[ing] a wider possibility of choice as regards the prototype function" (e.g., see applicant's specification at page 2, lines 8-18). Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to implement an OFDM/OM signal in Yeap in order to provide the well known advantage of "operat[ing] without any guard interval and also provid[ing] a wider possibility of choice as regards the prototype function" (e.g., see applicant's specification at page 2, lines 8-18).

Regarding claims 3, 4, 6, 17, 19 and 21, Yeap in view of AAPA teach the method discussed above regarding claims 12, 15, 16 and 20, and further, AAPA admits that "[f]or OFDM/OM, the use of a mathematical transform and of the reverse Fourier transform (conventionally FFT¹ then FFT) is therefore assumed" (e.g., see applicant's specification at page

3, lines 18-21). Thus, at the time of the invention, it would have been obvious to one of ordinary skill in the art to utilize a reverse Fourier transform since AAPA admits that “[f]or OFDM/OM, the use of a mathematical transform and of the reverse Fourier transform (conventionally FFT¹ then FFT) is therefore assumed” (e.g., see applicant’s specification at page 3, lines 18-21).

Further, regarding claims 4, 6, 17, 19 and 21, Examiner takes official notice that it is well known in the art that predetermined phase shifts and/or phase shift multipliers are implemented in the aforementioned reverse Fourier transform. Thus, at the time of the invention it would have been obvious to one of ordinary skill in the art to include predetermined phase shifts and/or phase shift multipliers in the method of Yeap in view of AAPA since it is well known in the art that predetermined phase shifts and/or phase shift multipliers are implemented in the aforementioned reverse Fourier transform.

Allowable Subject Matter

11. Claims 5 and 7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: claims 5 and 7 each recite specific mathematical equations for implementing claimed modulation and demodulation methods, respectively, wherein such an implementation was not found in a search of related prior art.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Nos. 4,959,863 to Azuma et al.; 6,018,753 to Kovacevic et al.; and 6,466,957 to Messerly et al. each disclose methods for transmitting multicarrier signals.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin M. Philpott whose telephone number is 571.272.3162. The examiner can normally be reached on M-F, 9:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571.272.3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Justin M. Philpott